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# Internationalization speed, resources and performance: Evidence from Indian software industry

Naveen Kumar Jain[a], Sokol Celo[b], Vikas Kumar[c,d,*]

[a] Sultan Qaboos University, Oman
[b] Sawyer Business School, Suffolk University, 120 Tremont Street, Boston, MA 02108, United States of America
[c] National Research Base of Intelligent Manufacturing Service, Chongqing Technology and Business University, China
[d] The University of Sydney Business School, University of Sydney, NSW 2006, Australia

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ABSTRACT

Rapid internationalization provides firms with quick access to global markets, but also constrains their capacity to absorb the expansion. Identifying the resources and capabilities that are most likely to moderate the relationship between rapid internationalization and performance is, therefore, of great interest. We focus on the software service industry in the specific context of the Indian emerging economy and investigate the role of linkage, leverage and learning capabilities. We use a unique longitudinal dataset from the Indian software sector as a setting to test our posited relationships and our findings largely support our predictions.

## 1. Introduction

A growing body of research has focused on the internationalization of multinational enterprises (MNEs) from emerging markets (EMNEs) and identified important ways in which they differ from MNEs from developed markets (Cuervo-Cazurra, 2012; Guillén & García-Canal, 2009; Luo & Tung, 2007; Mathews, 2002, 2006). EMNEs may possess less traditional ownership advantages, but they compensate by using market and non-market advantages emanating from their home country institutional environments (Cuervo-Cazurra & Genc, 2008; Kothari, Kotabe, & Murphy, 2013; Luo & Tung, 2018). They are also said to possess different types of ownership advantages such as a deep understanding of customer needs in emerging markets and the ability to function in difficult business environments (e.g., Cuervo-Cazurra & Genc, 2008; Ramamurti, 2012). Unlike their counterparts from developed markets, EMNEs use internationalization to gain competitive advantage in both foreign and domestic markets (Gaur, Kumar, & Singh, 2014; Luo & Tung, 2007) and often their M&A activity is driven by strategic reasons, such as to obtain essential technologies or competencies rather than to promote efficiency or instant growth (Kumar, 2009; Mathews, 2017; Popli, Akbar, Kumar, & Gaur, 2017).

This line of inquiry has observed that the EMNEs internationalize more rapidly than their developed market counterparts (Deng & Yang, 2015; Guillén, 2002; Mathews & Zander, 2007; Sun, Peng, Ren, & Yan, 2012) or at least more rapidly than the stages model would suggest (Ramamurti, 2012). While both developed market MNEs as well as EMNEs may pursue rapid internationalization, it is a greater need for EMNEs because they are driven by a motivation to catch-up with the established mature multinationals (Kumarasamy, Mudambi, Saranga, & Tripathy, 2012; Luo & Tung, 2007). Given this, there is a need to understand better which advantages can help with successful internationalization and which not (Ramamurti, 2012). The internationalization speed literature, accordingly, has increasingly shifted its focus to studying the resources that have the potential to moderate the relationship between speed of internationalization and firm performance (SI-P) (Chang & Rhee, 2011; Garcia-Garcia, Garcia-Canal, & Guillen, 2017). Perspectives, such as Linkage-Leverage-Learning (LLL) and Springboard theory have been advanced to explain EMNEs' rapid internationalization (Luo & Tung, 2007; Luo and Tung, 2018; Mathews, 2006, 2017). However, these new emergent theoretical perspectives do not specifically address the performance implication of rapid internationalization. To fill this lacuna and contribute to the new emergent perspectives on EMNEs, we investigate the resources that moderate the SI-P relationship in the context of Indian software service industry. We use the internationalization speed literature along with the LLL perspective to examine the service EMNEs' capabilities, such as, knowledge acquisition and linkage capabilities, customer leveraging capabilities, and learning and its retention capabilities.

The LLL perspective suggests that EMNEs, which, in general, begin their internationalization journey as vendors to developed market MNEs, link themselves with their customers in order to access and acquire knowledge, leverage those customer relationships to gain further

* Corresponding author at: Discipline of International Business, The University of Sydney Business School, University of Sydney, NSW 2006, Australia.
*E-mail addresses:* njain001@fiu.edu (N.K. Jain), vikas.kumar@sydney.edu.au (V. Kumar).

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traction, and learn from their repeated experiences to internationalize rapidly (Mathews, 2006). However, research on speed of internationalization and its effect on MNE performance (for example, Vermeulen & Barkema, 2002), has found the lack of time at the disposal of rapidly internationalizing firms to be the main constraint in making it difficult for them to overcome internationalization related risks, subsequently lowering their performance. While such a negative effect might not be experienced in the context of software service EMNEs (Contractor, Kumar, & Kundu, 2007), we posit that the LLL capabilities of EMNEs are likely to moderate the SI-P relationship by attenuating the time-related constraints on the one hand and enhancing the performance benefits on the other.

We use the Indian software industry to study our research question and believe it to offer an ideal setting to investigate the role of LLL capabilities (Ray, Ray, & Kumar, 2017) in shaping the SI-P relationship for a variety of reasons. Rapid growth is particularly essential to this industry. In a series of interviews with executives of leading software companies, commenting on the maxim 'Grow fast or die slow' all the respondents agreed with the first part ('Grow fast'); the only difference in opinion was as to 'die slow' or 'die fast' (Kutcher, 2015). However, at the same time it's becoming clear to most in the software and technology community that the days of growth at any cost are over and software companies must target becoming profitable rapidly and efficiently (Gnanasambandam, Miller, & Sprague, 2017; Kutcher, 2015).

In any case, whether as an active strategic move or as a response to the needs of global clients, given the high technological obsolescence in the industry, Indian software firms have not only rapidly expanded internationally during the last two decades but also become leading software service providers globally. There is also a need for them to become profitable quickly, given the high level of global and domestic competition in this industry. We examine our research question with the help of a unique longitudinal dataset we built by combining publicly-available information with personal communications. The dataset consists of information about the internationalization of largest publicly-listed Indian software companies for the ten-year period between 2000 and 2009. The results of our empirical tests mostly support our theoretical predictions (see Fig. 1) and provide evidence that, indeed, developing the right capabilities help firms overcome the challenges related to rapid internationalization.

Our study contributes to the existing research in several ways. First and foremost, our research joins a relatively new strand of research (for example, Chang & Rhee, 2011; Garcia-Garcia-Garcia et al., 2017) and constitutes a step forward in unpacking the SI-P relationship. It does so in the context of software service EMNEs that has not been examined in this particular context. Software service EMNEs have been observed to internationalize rapidly in order to acquire strategic resources overseas and sell their products quickly in a fast-changing external environment (Lorenzen & Mudambi, 2013). Further, they need to not only catch-up with developed-country MNEs but also protect their own competitive positions locally in the wake of rapid expansion of developed country MNEs in their home markets (Luo and Tung, 2018). Their internationalization, therefore, happens at a faster pace compared to manufacturing companies because it is easier for service firms to expand overseas merely by setting up a sales office (Javalgi, Dixit, & Scherer, 2009; Lamin, 2013). However, these firms also confront clients that are biased towards local firms for sourcing their service needs (Capar & Kotabe, 2003; Hitt, Bierman, Uhlenbruck, & Shimizu, 2006; Lamin, 2013). As a result, the rapid internationalization comes at the cost of having a potential negative influence on firm performance (Vermeulen & Barkema, 2002). Second, we move the EMNE literature and the LLL perspective beyond the antecedents of rapid internationalization to address the issue of potential lower performance associated with rapid internationalization. Further, we augment the LLL perspective by underscoring the significance of not only the originally-conceived external linkage but also internal linkage for a rapidly internationalizing EMNE (Lu, Ma, Taksa, & Wang, 2017). Similarly, we widen the LLL perspective's emphasis on learning to include learning retention as well for software service EMNEs where human resource, one of their most important resources, is highly mobile (Ray et al., 2017).

Our study also makes practical contributions. We are able to theorize and provide empirical evidence that helps identify specific resources that a service firm, such as, a software firm can use to its advantage when internationalizing rapidly. We identify these resources under the purview of the LLL perspective. We suggest these firms to develop resources to establish external and internal linkages, leverage those linkages and learn from and retain those linkages. By doing so, we believe that the managerial community, particularly the service industry, may gain from our results as we identify and explore some very pertinent service firm related resources that need to be nurtured for rapid internationalization.

The remainder of this paper is organized as follows. In the next section, we review the literature on internationalization speed. This is followed by the development of the hypotheses. We detail the empirical aspects, including our sample, operational measures and estimation in the next section. Later, we discuss the results of our analyses. Subsequently, we conclude by outlining the limitations of the paper and

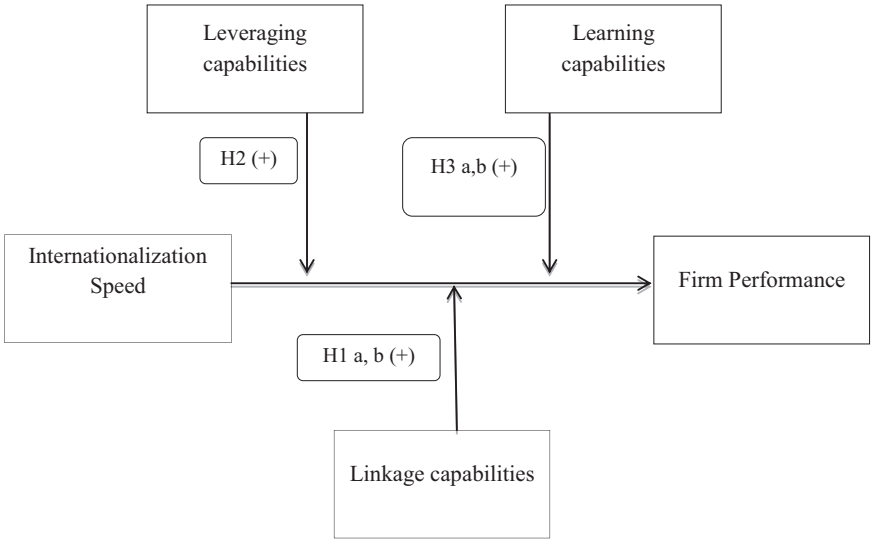


**Fig. 1.** Theoretical model.

the directions for further research.

## 2. Background literature and theory development

### 2.1. Internationalization speed

Our study is concerned in the first place with the role played by resources in shaping the SI-P relationship rather than the role of SI itself. Nevertheless, we consider it instructive to discuss shortly the construct of SI, its antecedents as observed in the extant literature, and the advantages and disadvantages of SI. The latter are particularly crucial to the theorizing about potential positive moderation effects by various types of resources, since regardless of whether the main effect of SI on performance is negative or positive, a moderating resource would be expected to weaken disadvantages and/or strengthen the advantages of SI.

Internationalization speed, as proposed by Vermeulen and Barkema (2002) is the amount of overseas expansion by a firm in a given period. Firms need time to absorb new knowledge learnt from an idiosyncratic environment of a host country, without which firms are unlikely to learn from internationalization. Despite being an important concept, internationalization speed still evades our comprehensive understanding. Extant literature on the topic has mainly examined the antecedents of internationalization speed and the speed–performance relationship. To study these research questions, the dominant theoretical framework used is the organizational learning literature. Recently, Chetty, Johanson, and Martín (2014) have used the Uppsala model to propose a multidimensional conceptualization and operationalization of internationalization speed.

As far as the antecedents of internationalization speed is concerned, the drivers examined are related to culture, international experience, availability of learning opportunities, family ownership and network ties (Casillas & Moreno-Menendez, 2014; Chandra, Styles, & Wilkinson, 2012; Chen & Yeh, 2012; Gao & Pan, 2010; Garcia-Garcia et al., 2017; Hutzschenreuter, Voll, & Verbeke, 2011; Lin, 2012; Musteen, Francis, & Datta, 2010; Powell, 2014). For example, a high level of added cultural distance in one period has a negative influence on organizational learning, limiting MNEs' internationalization speed in subsequent periods (Hutzschenreuter et al., 2011). This happens because organizational learning is facilitated only when new knowledge is neither very similar to nor very different from the old one (Cohen & Levinthal, 1990). Similarly, higher extant cultural diversity of MNE subsidiary network reduces the rate of subsequent international expansion. However, eventually, firms are observed to learn from their experience and can increase their internationalization speed. Experience increases the repository of knowledge routines of firms. It also enables firms to draw on appropriate routine to resolve quickly an issue arising in an unknown new territory where a firm might have just expanded. Therefore, international experience has a positive influence on speed of internationalization (Chen & Yeh, 2012). Also, cumulative entry experience gained with the help of joint venture and wholly-owned subsidiary modes speeds up a firm's pace of sequential internationalization more than that gained with help of contractual arrangements (Gao & Pan, 2010). Recently, Casillas and Moreno-Menendez (2014) illustrate a curvilinear influence of depth and diversity of international experience on MNEs' internationalization speed. Further, a study on Czech SMEs notes CEOs' language commonality with their international ties influencing the internationalization speed of their firms (Musteen et al., 2010). Scholars also note that the firms' internationalization speed depends on the context in which it operates. The context includes its history, path dependence, learning opportunities available, and the networks in which it operates (Chandra et al., 2012). Additionally, family ownership and firm profitability have positive influence on internationalization speed (Lin, 2012; Powell, 2014).

Parallel to the search for the antecedents of the speed of internationalization (SI), another related but distinct stream of research has looked at the effects of SI on MNE-performance. In absence of appropriate meta-studies, it is difficult to draw conclusions and the studies that do include more or less extensive reviews, so far provide an unclear picture with negative, positive, mixed, and curvilinear relationships all being found (e.g., Chetty et al., 2014; Garcia-Garcia et al., 2017).

The earliest and the predominant predicted outcome is a negative relationship between the two (Vermeulen & Barkema, 2002). This happens as a result of punctuated learning and increased learning costs invoked by rapid internationalization. For example, time compression diseconomies increase the cost of organizational learning in a fast-paced international expansion, and hence, a rapid expansion does not provide enough time to an MNE to process and assimilate information gathered across culturally-different host countries (Chang & Rhee, 2011; Vermeulen & Barkema, 2002). Further, because the MNE is afforded only little time to adapt its systems and procedures to meet the unique requirements of doing business in foreign markets, the MNEs with high internationalization speed experience a negative relationship with performance because they face increased liabilities of foreignness (Vermeulen & Barkema, 2002). The literature also attests to the survival hazards in case of early internationalization of new ventures (Mudambi & Zahra, 2007; Sapienza, Autio, George, & Zahra, 2006). Further, an MNE derives profit from internationalization as a result of its ability to create a repository of knowledge-based routines by assimilating unique context-driven knowledge transferred by various subsidiaries to headquarters. The assimilated knowledge is, then, relayed to a new subsidiary attenuating its survival hazards in a host country (Foss & Pedersen, 2002; Gao & Pan, 2010). However, the haste in which local knowledge is acquired due to rapid internationalization hinders proper decodification of the ambiguous causal mechanisms of doing business in a culturally-distant host country, and hence, impedes knowledge transfer from subsidiaries to headquarters (Zeng, Shenkar, Song, & Lee, 2013). Consequently, rapid internationalization hinders development of knowledge-based routines and its transfer to other subsidiaries. It is, therefore, not surprising that a fast paced internationalization results in misappropriation of local knowledge and transfer of misleading knowledge to a new context with negative influence on profitability (Nadolska & Barkema, 2007).

The arguments above emphasizing the negative effects of SI draw, however, from the insights of the Uppsala model of internationalization (e.g., Johanson & Vahlne, 1977). Unsurprisingly, when non-traditional patterns of internationalization, such as “born globals” (Li, Qian, & Qian, 2012; Zhou & Wu, 2014), “born-again globals” (Jantunen, Nummela, Puumalainen, & Saarenketo, 2008), and “latecomer” multinationals (Chang & Rhee, 2011; Ray et al., 2017), are observed and studied, there is an opportunity to revisit the role of SI as well. Accordingly, another stream of research argues that the SI-P relationship is more complex and that at lower levels of SI at least, the benefits might outweigh the costs (e.g., Garcia-Garcia et al., 2017; Mohr & Batsakis, 2017). The first obvious benefit of rapid internationalization is the potential for obtaining a first-mover advantage (Mohr & Batsakis, 2017). Even if such potential is limited, rapidly internationalizing firms upgrade their current knowledge base and develop their strategic resources more quickly (Guillén & García-Canal, 2009). Interestingly, a further argument in support of rapid internationalization is related to the concept of ‘asset erosion’ introduced by Dierickx and Cool (1989) in the same article as ‘time compression diseconomies,’ a main argument against rapid internationalization. According to this concept, knowledge depreciates over time and firms that internationalize rapidly are able to extract value from their resources before they become eroded and obsolete (Chang & Rhee, 2011; Mohr & Batsakis, 2017). All these positive effects, however, give way to negative ones with further increases in SI (e.g., Garcia-Garcia et al., 2017; Mohr & Batsakis, 2017).

Certainly, both sets of arguments have merit. The fact, however, that the empirical results are very mixed seems to point to contingencies. Research in this direction has started, but it's still scarce. Scholars have begun to examine moderators of the speed and

performance relationship including firms' internationalization experience and resources (Chang & Rhee, 2011), the extent of CEOs' geographic network (Musteen et al., 2010) and later- versus earlier-mover subsidiaries (Jiang, Beamish, & Makino, 2014). However, drawing conclusions based on these studies as to which resources moderate the SI-P relationship is very problematic not only and not primarily because there are only few studies. The more important reason is that resources are and should be contextualized (Khanna, 2014; Xu & Meyer, 2013). As described earlier, EMNEs differ from MNEs from developed countries in terms of their resource and ownership advantage profiles, and also in their pattern of internationalization. The other important dimension is the sector, with important differences between services and manufacturing (Contractor et al., 2007). Our study is concerned with the context of EMNEs in the software industry. It is within this context that we investigate the role of different resources in weakening the negative/strengthening the positive effects of SI. In order to identify the relevant resources and understand their role, we use two new and interrelated emergent perspectives, namely the LLL (Mathews, 2006, 2017) and the springboard theory (Luo & Tung, 2007; Luo & Tung, 2018), which are particularly suited to questions in hand since they have been developed with internationalization of EMNEs as their underlying premise.

### 2.2. The LLL perspective and the springboard theory

The LLL perspective (Mathews, 2006) argues that EMNEs' internationalization is explained not by the ownership or firm-specific advantages as prescribed in Dunning's OLI framework (Dunning, 1998), but by their ability to form linkages with developed market multinationals that typically operate at the frontiers of technological know-how. It is through these linkages that EMNEs can tap into advanced technologies and subsequently leverage them for their own global competitiveness (Mathews, 2017). EMNEs repeatedly form these linkages with their developed market clients as well as with new players, and, in the process, accelerate their own learning through upgradation of their routines and processes (Luo & Tung, 2007). This enables EMNEs to circumvent specific problems, such as, being latecomers to the global arena, and overcome the lack of resources and capabilities in a relatively shorter time span (Bandeira-de-Mello, Fleury, Aveline, & Gama, 2016; Mathews, 2002, 2006), and that facilitates their rapid internationalization speed. The Springboard theory originally proposed by Luo and Tung (2007) and more recently refined (Luo & Tung, 2018) share similar rationale in explaining the internationalization phenomenon of EMNEs. They emphasize on the aggressive approach of EMNEs for asset-seeking through strategies of international mergers and acquisitions, implying a relative higher speed of internationalization by EMNEs. In fact, EMNEs tend to be radical in their internationalization by setting up their first venture, sometimes, in advanced markets instead of other emerging markets (Luo & Tung, 2007). This suggests that the overpowering motivation for EMNEs to form linkages with and learn from the developed market MNEs is to leapfrog certain stages typical in the internationalization process. We consider the above perspectives as being very relevant for our theoretical discourse in investigating the moderating effect on the SI-P relationship for EMNE service firms.

In the following sections, we examine the moderating influence of the service firms' external and internal linkage, leveraging and learning capabilities on SI-P relationship. Particularly, we use software firms' technical employee strength, quality accreditation, customer relationship, international experience and ability to retain employees as denoting the LLL capabilities of Indian software firms. More specifically, we argue that the employees of software firms are the key resources that possess knowledge to foster external linkages and quality certifications reflect capacity to form internal linkages within the firm. Both, external and internal linkages are important in the context of rapid internationalization (Lu et al., 2017; Mathews, 2017). Relationship with customers and their ability to understand client brief is what software firms leverage to expand their business. Repeated application of forming linkages and leveraging them allows software firms to gain valuable international experience which forms the basis of their learning capabilities. Such learning typically resides in the minds of employees and retaining the employees, thus, becomes essential. Mathews (2017) identifies learning as the least developed concept in the LLL framework, thus in need of refinement. Here, we do so by incorporating learning through retaining employees in the firm.

### 2.3. Internationalization speed, linkage capabilities, and firm performance

Lacking internal knowledge stock, EMNEs are reported to acquire knowledge externally, mainly from their developed-country based business customers by establishing contractual work agreements with those MNEs (Lorenzen & Mudambi, 2013; Mathews, 2006). Linkage enables EMNEs to acquire and build their knowledge stock, an asset they need to grow globally (Mathews, 2006). However, rapidly internationalizing EMNEs suffer from enhanced liability of foreignness because they need to procure and absorb knowledge from their external new environment rather quickly, and, in the process, end up influencing their profitability. Therefore, EMNEs need to possess human talent that can sift through the available external knowledge and pick quickly the suitable ones for their firms' growth (Mathews, 2006). However, acquiring knowledge from external sources residing at distant locations may prove to be a risky, cumbersome and very expensive affair. For example, in the context of technologically-intensive software industry, the cutting-edge knowledge resides mainly in developed countries. EMNEs, with their limited resources, may not be able to go fast in acquiring the knowledge stock. At the same time, developed market firms may not be willing to award contractual obligations to EMNEs for a technically-advanced project because the former may doubt the technical qualifications of the latter. All this can hinder the linkage capabilities of EMNEs. Therefore, we posit that a higher number of technical staff, including quality control engineers, (relative to marketing and administrative staff) will alleviate the negative effect and/or enhance the positive effect of rapid internationalization on the performance of a service EMNE.

First and foremost, the technical staff can interact comfortably with clients, comprehend their project brief and acquire the requisite knowledge more effectively, quickly and efficiently than, for example, marketing staff can. This is likely to help mitigate the liability of foreignness that leads to reduced performance for rapidly internationalizing firms. Second, by having more technical staff, an EMNE signals to its client that it is willing to learn not only from them but also autonomously, giving latter the confidence of a quality project delivery. Based on this confidence, clients are likely to award their projects to the EMNE that has more technical staff than other type of staff (Bonaglia, Goldstein, & Mathews, 2007; Ray et al., 2017). This may attenuate further the liability of foreignness precipitated for rapidly internationalizing EMNEs. Third, the technical staff may enable the EMNEs to address the specific issues related to product customization and project comprehension that only get compounded in rapidly internationalizing EMNEs because of the lack of time to develop knowledge transfer routines (Vermeulen & Barkema, 2002). Third, the technical staff may prepare the firm quickly for an increased quantity and heterogeneity of work precipitated by its rapid internationalization. Once a client is roped in, the EMNE is able to increase its external linkage and acquire external knowledge rapidly. Therefore, it is technical staff that promotes external linkages of EMNEs rapidly with positive influence on the SI-P relationship. Hence, we propose, as also shown in Fig. 1, the following:

**H1a.** A service EMNE's external linkage capabilities will positively moderate the relationship between internationalization speed and firm performance.

Once an EMNE acquires external knowledge by forming contractual arrangements with developed market firms, the acquired knowledge is likely to be at its different offices spread across various countries. Therefore, it faces another challenge to link internally this highly-dispersed knowledge to make the newly-acquired knowledge worthwhile and derive benefits from it. This challenge gets aggravated in a rapidly internationalizing EMNE because of the severe time constraint it faces to link the dispersed knowledge. The establishment of such linkages is important for unsticking knowledge from its location and leading to its sharing with other nodes within the firm. The knowledge sharing results in better project control and optimum schedule and effort estimation that improve project, and therefore, firm profitability.

The internal linkages can help an EMNE exercise better control of a project quality, with positive influence on firm profitability. In the context of rapid internationalization, a better control is likely to improve project quality by managing the fast expanding organizational boundaries and enabling the EMNE to deliver a high service quality, with positive effect on control and success rate of a project (Benner & Tushman, 2002; Jensen & Petersen, 2014). Indeed, a high level of quality control followed by Indian software firms is reported to increase their performance by lowering project effort, elapsed time, and software rework (Gopal, Mukhopadhyay, & Krishnan, 2002).

Further, the internal linkages will help a rapidly internationalizing service EMNE tap knowledge about various projects residing at various offices. Such knowledge in the context of software firms includes, for example, estimations of the schedule and the efforts needed to finish a project (Ethiraj, Kale, Krishnan, & Singh, 2005). This is likely to enhance a rapidly internationalizing EMNE's performance by increasing project efficiency because service professionals form an expensive resource. Therefore, the vendor firm, in order to finish the project efficiently, needs to appraise what and when skill-sets will be needed during the currency of the project so that the right employee can be recruited at a suitable time, reducing the ‘on-desk’ manpower in the firm. Indeed, in the context of Indian business process outsourcing firms, quality management capabilities have been found to play a significant role in the effective knowledge transfer, diffusion and the development of market-based organizational learning capabilities (Malik, Sinha, & Blumenfeld, 2012). Without proper internal linkages that reflect quality management, a rapidly internationalizing EMNE may not be able to benefit from an, otherwise, rich knowledge it may possess about its discrete projects at various nodes. On the other hand, stronger internal linkages reflected by a higher quality management will enable the EMNE to finish a project within the budget that it quoted to its client initially to get the project, resulting in improving its profitability. Therefore, we hypothesize the following.

**H1b.** A service EMNE's internal linkage capabilities will positively moderate the relationship between internationalization speed and firm performance.

### 2.4. Internationalization speed, leveraging capabilities, firm performance

Rapidly internationalizing EMNEs face two issues. They incur an upfront, and rather quickly, substantial internationalization related costs, and to mitigate that, they need to generate business in new countries speedily. Second, they suffer from time compression diseconomies to coordinate their activities with those of their clients. Leveraging capabilities are likely to mitigate these risks. EMNEs are suggested to internationalize rapidly by leveraging their linkages formed with developed market MNEs (Mathews, 2006). EMNEs may leverage their business ties with developed market MNEs and benefit in three possible manners. Leveraging may mitigate EMNEs' liabilities of outsidership and foreignness. Leveraging may enable EMNEs to get a larger and higher value-added share of the contracts from their customers. Leveraging may allow EMNEs to comprehend the project requirements better. All this will have a positive influence on performance of a rapidly internationalizing firm.

EMNEs need to leverage their client connections in order to internationalize rapidly because their low brand recognition and tough competition from entrenched local and developed market firms make it tough for EMNEs to procure business from new clients in host countries (Capar & Kotabe, 2003; Hitt et al., 2006; Mathews, 2006). Leveraging of relationships with existing customers can mitigate, to a large extent, these risks for a rapidly internationalizing EMNE. Indeed, strong relationship with existing customers has been identified as one of the most important resources of service firms (Hitt et al., 2006). In fact, an ability to understand client preferences and routines is noted to be a must-have skill for service firms' internationalization (Jensen & Petersen, 2014).

Leveraging will most likely enable a rapidly internationalizing EMNE to get referrals from its existing clients. These referrals are likely to help the EMNE mitigate, to a large extent, its liability of outsidership in a new host country, helping it win the bid for a new project even in the face of stiff competition from entrenched vendors (Capar & Kotabe, 2003; Johanson & Vahlne, 2009). Equipped with referrals, a rapidly internationalizing EMNE may be able to overcome its low brand recognition related issue and win the confidence of a new client in a timely manner by highlighting the testimonials of highly satisfied clients. A rapidly internationalizing EMNE with, on the other hand, weak customer relationship is unlikely to procure satisfactory referrals from their existing customers.

Moreover, leveraging may enable a firm to get long-term, repetitive business from its existing customers. Vendors may develop confidence to leverage their high level of client trust to bid for and procure a bigger pie of a high-value project. Indeed, trust in a relationship breeds the ability to take an increased exposure in a transaction (Moran, 2005). The revenue stream generated from these projects can act as a buffer until a rapidly internationalizing EMNE manages to generate new business in a new host country, enabling it a longer play in new host countries than the firms with weak customer relationship can. An ability to stay longer in a new country can increase the likelihood of getting business in additional new host countries, with positive influence on a rapidly internationalizing EMNEs' profitability.

Even when a client business is procured, rapidly internationalizing EMNEs, because of time compression diseconomies, may find it tough to control and coordinate their own activities with those of their clients (Jiang et al., 2014). With lack of coordination and control, a rapidly internationalizing EMNE may find it tough to resolve issues that normally arise during the currency of the project, such as, clients changing their project brief specifications during the currency of the projects, vendors' inability to comprehend the project briefs or procure information in a timely manner. These issues result in sunk labor costs and decreased project profitability for the EMNE (Gu & Jung, 2013).

Leveraging is likely to facilitate coordination between vendors and clients out of mutual obligation (Moran, 2005). A strong client-vendor relationship may give rise to such norms and obligations that will have the client act patiently and cooperatively with the vendor to resolve the commonly observed issues. Further, strong client-vendor relationship engenders high level of trust in the relationship. Trust allows a client to be more open with its vendor firm, enabling the latter to get involved in a project from its initiation stage, and hence, get timely information and understand the project properly (Dibbern, Winkler, & Heinzl, 2008; Ethiraj et al., 2005; Malhotra & Morris, 2009).

Further, equipped with capabilities to leverage their deep and sustained relationship with clients, a rapidly internationalizing service firm may even get novel information about a new project in advance, benefitting the vendor firm by enabling it to recruit qualified professionals in a talent scarce market and put together a project team before its competitors can (Darr, Argote, & Epple, 1995).

Therefore, leveraging the customer relationship will help in alleviating the negative performance effect of a rapidly internationalizing service firm. Hence, we propose the following.

**H2.** A service EMNE's leveraging capabilities will positively moderate the relationship between internationalization speed and firm performance.

### 2.5. Internationalization speed, learning capabilities, and firm performance

For EMNEs, learning sets in motion a virtuous cycle. Based on their past learning, EMNEs can increase their linkage and leveraging capabilities with developed market MNEs, increasing the former's growth and internationalization (Mathews, 2006). Learning assumes a great significance for a rapidly internationalizing firm for the following reasons (Garcia-Garcia et al., 2017). With increase in internationalization speed, the firm faces disruption in development of knowledge routines that are noted to grow only at a slow pace due to time compression diseconomies (Dierickx & Cool, 1989; Jiang et al., 2014). A typical EMNE, lacking well-developed knowledge routines, is constrained in its ability to transfer a compatible knowledge routine from its existing stock to a culturally and institutionally different host nation, lowering its performance (Nadolska & Barkema, 2007). The issue is exacerbated for rapidly internationalizing service firms because they need more product customization and effective project brief comprehension to service their quickly increasing international client base (Capar & Kotabe, 2003). As a result, top management is required to attend to these issues and it consumes disproportionate amount of their time that they could have invested in the activities leading to an enhanced firm performance. International experience has been identified as an important source of learning for EMNEs (Luo & Tung, 2007; Mathews, 2006). Indeed, international experience is noted to moderate the internationalization speed and firm performance for developed country MNEs (Garcia-Garcia et al., 2017). We examine it for service EMNEs. We would even speculate that international experience matters more for EMNEs considering that, often, they invest in countries that are physically or economically 'distant' (Ramamurti, 2012) because their strategies are based on generating economies of joint operation based on differences rather than similarities across countries (Celo & Chacar, 2015; Ghemawat, 2007).

Learning enables a firm to select an optimum location and enter there rapidly because it allows the firm to apply successfully its existing knowledge stock to that location (Chen & Yeh, 2012). At the same time, with increasing international experience, a service EMNE is likely to operate in different institutional and cultural environments, deepening and refining its knowledge repository (Dau, 2013). Consequently, the firm is more likely to find an overlap between its existing knowledge routine and a new knowledge acquired in a host country, accelerating its learning capabilities (Casillas & Moreno-Menendez, 2014; Cohen & Levinthal, 1990; Garcia-Garcia et al., 2017). In the context of rapid internationalization, the importance of the overlap in knowledge routines increases many times because it enables the EMNE to not only have two successive foreign entries within shorter time gaps (Zollo & Winter, 2002) but also handle suitably a complex or even an unprecedented context in a host country (Garcia-Garcia et al., 2017). As a result, EMNEs are able to unlock their top management members' time to resolve other issues associated with fast-paced internationalization (Garcia-Canal & Guillen, 2008; Vermeulen & Barkema, 2002). Hence, we propose the following:

**H3a.** A service EMNE's learning capabilities will positively moderate the relationship between internationalization speed and firm performance.

The service firms need to work hard to retain their learned knowledge because human capital, one of the chief resources of service firms, walks out of their premises every day (Hitt et al., 2006). Emerging markets are not immune to the challenge. While discussing the findings of India Employee Turnover Study, Yiu and Saner (2014) concluded that employee attrition and retention would remain at on the top of the list of challenges to be managed by the HR function in India for years to come (Yiu & Saner, 2014: 6). Especially, in the case of software services, the growth of exports does indeed create employment opportunities, but at the same time this growth masks the major problem of worker turnover (Chakraborty & Dutta, 2002). Suffering from time compression diseconomies related to absorptive capacity, rapidly internationalizing firms are more likely to suffer than a slowly internationalizing firm if knowledge attrition happens. For example, in the case of service firms, employee retention, given that it enables repetitive interactions between client-vendor employees, may facilitate knowledge transfer that, otherwise, gets hampered due to cultural and geographic distances (Carmel & Agarwal, 2002). Moreover, the repetitive client-vendor interactions may have the vendor team identify with the client, motivating the former's team to perform greater in-role and citizenship behaviors with positive influence on service quality and firm performance. At the same time, as employees work on similar projects, they increase their expertise, enhancing the quality of the subsequent projects they work upon. All this results in lowering the cost of doing business with the client and increased profitability for a rapidly internationalizing software firm (Dibbern et al., 2008). This is not possible, however, when a rapidly internationalizing service EMNE has high attrition rate because it is afforded little time to rebuild all these capabilities. A study by Chakraborty and Dutta (2002) looking at growth patterns and constraints Indian software industry found that prepackaged software accounted for < 30% of total export revenue despite being the most profitable segment of the industry. In trying to understand the reasons, they asked companies to identify the difficulties they encountered and found among others, that 71% of the companies agreed that high attrition rate was a major concern. Authors concluded that high attrition rates translate into "…(S)lower growth, poor transfer of skills, reduced incentives for training investments and reinforced dependence on programming services" (Chakraborty & Dutta, 2002: 15). Further, clients are likely to lose trust in the capabilities of their vendors if vendor employees keep leaving the firm. Moreover, high attrition rate is likely to influence the motivational level negatively of not only the vendor team but also other employees working with the vendor firm.

Hence, we propose the following.

**H3b.** A service EMNE's learning retention capabilities will positively moderate the relationship between internationalization speed and firm performance.

## 3. Methodology and data

### 3.1. Data sources and the sample

As an empirical setting for this study, we chose the software industry in India. It is one of the few industries where India has registered rapid international expansion (Athreye & Kapur, 2009; Pradhan, 2007). Moreover, the software industry has been noted as one of the key engines of economic development and employment generation in emerging markets (Feiman & Knox, 2002). By studying Indian software industry, we could also control for home country and industry effects.

For our research, we decided to restrict ourselves to the largest (in terms of revenue) publicly-listed companies because majority of the Indian software companies are too small to attempt for foreign direct investment (FDI) (Gopal & Gao, 2009; Nadkarni & Herrmann, 2010; Pradhan, 2007). Further, the detailed information on foreign subsidiaries of private Indian firms in available official statistics such as the ones collected by the Government of India's Ministry of Finance, Prowess, or Nasscom is not rich enough for us to examine our research question (Pradhan, 2007). It is noteworthy that data collection with the help of annual reports or other publicly available information has been used by other scholars in the IB field (Dau, 2013; Hutzschenreuter & Voll, 2008; Paul & Gupta, 2014).

We could collect data about the FDI locations of 32 largest publicly-listed Indian software companies for the period 2000–2009. Our dataset included only those companies that had both registered office and corporate headquarters in India. Resultantly, those companies that were floated by Indians, however, had corporate headquarters or registered office in some other countries were excluded. Likewise, all firms with substantial presence in India, however, with foreign promoters were excluded. Though these companies make up only 29% of the total population of the 110 publicly-listed Indian hardware and software IT organizations as of June 2009, their share in foreign investments is substantially larger given the highly concentrated nature of the Indian software industry (Athreye & Kapur, 2009; Kumar, Mohapatra, & Chandrasekhar, 2009). In fact, according to Pradhan (2007), the top 60 of the 165 internationalized Indian hardware and software companies in 2006 accounted for 72.6% of the total overseas investments in this industry. Likewise, Gopal and Gao (2009) report that top five firms account for 30% and top 20 firms account for 53% of Indian software exports. Further, though our dataset comprised top 32 Indian software firms, we could capture a wide variation among them on various attributes. For example, the most internationalized firm chose 66 overseas locations during our studied period whereas the least internationalized chose only three. Similarly, their revenue ranged from 12 million to 5 billion US dollars (approximately) and employee strength from 500 to 145,000 employees. Paul and Gupta (2014) find that Indian software companies internationalize mainly through exports, with the largest of the lot inclined even less towards FDI. Given these statistics and the fact that the majority of Indian software firms are small and mid-sized firms with exports, and not FDI, as primary means of internationalization (Nadkarni & Herrmann, 2010), we did not see much value and efficiency in adding more firms.

The compilation of data was completed in two steps. First, we used several publicly-available sources of information to track the internationalization moves of these companies along with other firm data for the period 2000–2009. These sources included, but were not limited to, company annual reports, company websites, news items, initial public offer documents, and also company internal archival documents including intranets and presentations to media and investors. Most of these sources were available on the websites of various companies. We chose year 2000 as our base year primarily because significant foreign-currency-related changes by the Government of India at that time enabled firms to invest overseas aggressively since then (UNCTAD, 2004). In addition, the 'Y2K-software' assignments provided a stimulus for Indian software firms to grow rather aggressively internationally (D'Costa & Sridharan, 2004). Further, the telecommunication industry's deregulation which began in year 1999 provided tremendous boost to Indian software industry in subsequent years (Lamin, 2013). Finally, a large number of publicly-listed Indian software companies were privately held until then, and therefore, rich secondary data to examine our research question were not available systematically. For example, the largest Indian software firm, Tata Consultancy Services, came out with its public offer only by year 2004.

In a second step, we sent the preliminary lists of international locations to senior officials of the companies for verification. With follow-ups and personal interviews of senior officials of various companies, we received feedback from all 32 companies. Where discrepancies were found, further data were collected until we ensured the data were complete and accurate.

Overall, our data had 650 investments in 66 different countries for the period examined by us. Our panel was not balanced, since some of the firms started their internationalization in year 2000 or before, whereas others after 2000 but before 2009. Our ultimate unit of analysis, however, was Firm × Year, and after removing some outliers, we were left with 171 firm-year combinations.

### 3.2. Measures

#### 3.2.1. Dependent variable

*3.2.1.1. Firm performance*. It was measured using Return on Sales (ROS). Measures based on profitability are often used in studies that investigate the relationship between internationalization and performance (Capar & Kotabe, 2003), and are recommended for data that span a long period (Chang & Rhee, 2011). We calculated ROS with the help of the financial data given in the annual reports of various companies. We lagged all independent variables by 1 year to attenuate the issue of reverse causality. Therefore, ROS is measured for the financial year (FY) 2002–2009, whereas all independent variables for FY 2001–2008.

#### 3.2.2. Independent variables

*3.2.2.1. Speed*. Following previous research (see Chang & Rhee, 2011; Vermeulen & Barkema, 2002 for similar measures), we measured speed as the average number of new foreign countries entered per year. More precisely for every firm/year combination, we divided the number of foreign countries the firm had subsidiaries in the given year by the number of years since the first foreign entry.

*3.2.2.2. External linkage capabilities*. We measured this construct by calculating the percentage of software employees out of the total employees in a firm in a particular year (variable name: swtotal). The information was obtained from the annual reports of the companies. The more the percentage of software employees in a vendor firm, the more will be the technical capabilities but lesser will be the management capabilities. We posit that service firms, in order to mitigate the negative influence of speed on performance, would need not only technically qualified but also managerial talent. For example, qualified HR professionals are required to quickly assess effort inputs and procure them in a timely and cost-efficient manner to bid for a project at a lower cost. Additionally, service firms are susceptible to facing enhanced liabilities of outsidership in a host country as local clients are noted to prefer domestic or large vendors from developed countries (Capar & Kotabe, 2003). Hence, service firms may find it difficult to procure business from local firms in a host country, requiring qualified marketing talent.

*3.2.2.3. Internal linkage capabilities*. These capabilities are recommended to be measured with the help of some quality management standards that indicate two things - how well a firm's processes are managed and measured, and if firms are on a path towards attaining continuous improvement (Davenport, 2005). The most widely used set of standards in information technology and manufacturing industries are Software Engineering Institute's (SEI) Capability Maturity Model (CMM) developed by the Carnegie Mellon University and the ISO 9000 series, respectively. The CMMI (capability maturity model integration) accreditation, a broader application of CMM, its earlier version, with I standing for integration, has a ten times more rapid adoption rate in software industry than CMM and is one of the most-highly acclaimed accreditation in the global software industry (Kishore, Swinarski, Jackson, & Rao, 2012; Pant & Ramachandran, 2012). Therefore, we measure internal linkage capabilities as a dummy variable based on if a firm possessed CMMI level-5 accreditation (variable name: cmmi). CMMI has five levels of standards and each of the five levels (initial, repeatable, defined, managed, and optimizing) defines greater degrees of management control and sophistication. As per the SEI, Level 1, the basic standard, is accorded to a very ad hoc software organization with few defined processes. Level 2 denotes basic, repeatable approaches that track costs, schedules, and functionality of a project. The Level 3 firms are said to possess basic tenets of both good management and good software engineering, such as quality assurance. When firms begin to collect detailed measures of software process and quality, they are accorded Level 4 accreditation.

Finally, a Level 5 firm possesses, besides all of the previous capabilities, an environment that fosters continuous improvement, with learning from quantitative feedback and controlled experiments. The accreditation demonstrates quality management abilities of a software firm to develop high quality software systems with efficiency (Kishore et al., 2012). The application of the CMMI certification has been demonstrated to be linked with cost-related benefits, decreased time needed to complete tasks and increased predictability in meeting schedules, improvements in quality, increased customer satisfaction, and finally positive returns on investment (Goldenson & Gibson, 2003). CMMI level-5 accreditation is a rare resource considering that fewer than 5% of Indian software firms have been accredited with this certification by 2011.

*3.2.2.4. Leveraging capabilities*. We measure leveraging capabilities by two ways because leveraging is likely to enable a vendor firm to get long-term business from existing clients and it also helps mitigate the coordination related issues. Therefore, one measure is repeat business from existing clients, calculated as the percentage of overall revenue that comes from existing customers (variable name: *revexcust*) in a particular year. The frequency of repeat business from existing clients yields a service firm provider more number of occasions to gain insights into its client business. It is likely to gain customer-specific absorptive capacity with decreased transaction cost and increased client-specific capabilities (Dyer, 1996). For example, in the case of software firms, as client-specific service professionals work in a repetitive manner with the same clients, the former gets insights into clients' idiosyncratic ways of doing businesses. This may not only transfer knowledge efficiently between clients and vendors but also lower the cost of doing business with the clients (Darr et al., 1995). Moreover, repeat business also motivates vendors to invest in client-specific assets, both at human and equipment levels with positive impact on service vendor's performance. All this results in lowering of rework costs as fewer mistakes may occur in developing client-specific software projects (Dibbern et al., 2008). Moreover, repeat business from existing clients also signals to potential future clients a high level of satisfaction of the former from the service firm's delivery. Such positive signals lower a service firm's liabilities of outsidership in host countries and facilitate their international pursuits (Johanson & Vahlne, 2009).

The second way to measure this construct is to calculate the percentage of overall revenue that is classified by a firm as doubtful revenue (variable name: debt) which is unlikely to be recovered from its clients in a particular year. As a result of poor project comprehension and client coordination, vendor team may either develop a software that would need a lot of rework or write on a code that was not part of the project brief. This may lead to budget and time overruns. Resultantly, vendors end up billing additional service hours that are disputed by clients, creating doubtful recovery of revenue. On the other hand, a well-understood project brief results in high quality of work delivered to clients and is likely to increase the probability of timely and full recovery of amount billed to them by the vendor as the clients may not dispute the amount billed. Indian Software vendor firms may work on some projects that run for several years and are likely to see revenue flow in a staggered manner from their clients for such projects. However, doubtful debt does not include such payments because these are agreed upon, and hence, are likely to be cleared in the future by the clients. Doubtful debt includes such revenue that is disputed by the client and is unlikely to be paid even after follow-ups.

*3.2.2.5. Learning capabilities*. We used international experience to measure this construct. International experience is the number of years since the establishment of the first foreign subsidiary (variable name: *intlexp*) (Erramilli, 1991).

*3.2.2.6. Learning retention capabilities*. We measured this construct by calculating the percentage of employees that leave a firm in a particular year (variable name: *attrition*). The information was available in the annual reports of the companies.

### 3.2.3. Control variables

In all the models, we controlled for previous performance (variable name: *marginlead*), firm size (measured by the log of the number of employees; variable name: *logempl*), availability of financial resources (measured by cash; variable name: *cash*), firm age in the first year of our sample (variable name: *age*), and year effects (Chang & Rhee, 2011; Dau, 2013). Previous research shows that firm size, availability of financial resources, and firm age influence internationalization and performance (Chang & Rhee, 2011; Dau, 2013; Gao & Pan, 2010; Vermeulen & Barkema, 2002). We also control for a firm's business group affiliation (variable name: *busgroup*) and possession of knowledge management software (variable name: *kmsw*). Both of these are dummy variables that take a value of 1 if the firm has them and 0 otherwise. In order to classify our companies affiliation with business groups, we followed the categorization of Prowess dataset (Lamin, 2013).The variables, including the control variables used in our research, are in line with the variables used in other studies such as by Lamin (2013) on Indian software firms. However, we do not capture the influence of advertising and R&D resources that were studied by Chang and Rhee (2011) as Indian software firms invest only sparingly in these resources (Sonderegger & Täube, 2010).

## 3.3. Model

In Table 1, we show the descriptive statistics for the variables used and in Table 2 the correlations. As described earlier, our data are longitudinal. Because the sample consists of repeated observations of firms over time, the usual ordinary least square (OLS) models are inappropriate since the assumption of observations' independence is clearly violated.

We decided to use Generalized Estimating Equations (GEE), a generalization of the generalized linear model in which the focus is on the aggregate response for the population rather than the traditional regression parameters (see also Gao & Pan, 2010 for a similar application in the context of sequential entries of multinational enterprises).

An advantage of GEE is that it produces efficient estimates of the coefficients by taking into account the over-time correlations when the estimates are produced. Also, the GEE models can handle missing data on the dependent variable or unbalanced panels. In addition, the GEE models are not sensitive to the correlation structure, and therefore, are robust to any misspecification of the correlation structure (Liang & Zeger, 1986; Rabe-Hesketh & Skrondal, 2008). We used for our analyses robust estimators of variance, also called the Huber/White Sandwich Estimators in place of the default conventional variance estimator. As a result, our estimates are valid even in case of misspecification of the correlation structure.

**Table 1**
Descriptive statistics.

| Variable | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|
| *marginlead* | 0.13 | 0.1 | −0.37 | 0.35 |
| *logempl* | 8.12 | 1.59 | 4.88 | 11.88 |
| *age* | 16.88 | 10.13 | 1 | 51 |
| *busgroup* | 0.5 | 0.5 | 0 | 1 |
| *cash* | 420.6 | 1200.37 | 1.33 | 9695 |
| *kmsw* | 0.49 | 0.5 | 0 | 1 |
| *speed* | 1.08 | 0.6 | 0.17 | 4 |
| *revexcust* | 81.34 | 16.1 | 15 | 100 |
| *cmmi* | 0.5 | 0.5 | 0 | 1 |
| *debt* | 0.06 | 0.08 | 0.0001 | 0.55 |
| *swtotal* | 0.87 | 0.1 | 0.33 | 0.99 |
| *intlexp* | 9.75 | 7.21 | 0 | 30 |
| *attrition* | 16.27 | 7.09 | 1 | 48.6 |

**Table 2**
Correlation table.

| | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *marginlead* | 1. | 1.00 | | | | | | | | | | | |
| *logempl* | 2. | 0.39* | 1.00 | | | | | | | | | | |
| *age* | 3. | 0.33* | 0.73* | 1.00 | | | | | | | | | |
| *busgroup* | 4. | 0.06 | 0.2* | 0.32* | 1.00 | | | | | | | | |
| *cash* | 5. | 0.29* | 0.54* | 0.33* | 0.21* | 1.00 | | | | | | | |
| *kmsw* | 6. | 0.03 | 0.41* | 0.3* | −0.11 | −0.03 | 1.00 | | | | | | |
| *speed* | 7. | −0.14 | 0.15* | 0.03 | 0.16* | 0.24* | −0.02 | 1.00 | | | | | |
| *swtotal* | 8 | −0.05 | 0.16* | 0.11 | 0.01 | 0.19* | 0.11 | 0.18* | 1.00 | | | | |
| *cmmi* | 9. | 0.16* | 0.49* | 0.2* | 0.23* | 0.27* | 0.26* | 0.17* | 0.03 | 1.00 | | | |
| *revexcust* | 10. | 0.09 | 0.51* | 0.42* | 0.1 | 0.24* | 0.11 | −0.25* | 0.09 | 0.28* | 1.00 | | |
| *debt* | 11. | −0.24* | −0.03 | −0.21* | −0.12 | −0.1 | 0.12 | 0.09 | 0.12 | 0.01 | −0.11 | 1.00 | |
| *intlexp* | 12. | 0.36* | 0.78* | 0.82* | 0.11 | 0.39* | 0.36* | −0.2* | 0.06 | 0.26* | 0.43* | −0.14 | 1.00 |
| *attrition* | 13. | −0.26* | −0.27* | −0.25* | −0.04 | −0.21* | −0.15 | −0.22* | −0.25* | −0.04 | 0.14 | 0.02 | −0.21* |

* $p < 0.05$.

**Table 3**
Determinants of firm performance/generalized estimating equations.

| | M0 | M1 | M2 | M3 | M4 | M5 | M6 | M7 |
|---|---|---|---|---|---|---|---|---|
| *logempl* | 0.02 | 0.03* | 0.01 | 0.04*** | 0.02† | 0.02 | 0.02† | 0.04*** |
| | (0.01) | (0.02) | (0.02) | (0.01) | (0.01) | (0.02) | (0.01) | (0.01) |
| *age* | 0.002 | 0.0003 | 0.002 | 0.0005 | 0.0006 | 0.002 | 0.001 | −0.0002 |
| | (0.002) | (0.002) | (0.002) | (0.001) | (0.002) | (0.002) | (0.001) | (0.002) |
| *busgroup* | −0.03 | −0.01 | −0.02 | −0.007 | −0.02 | −0.03 | −0.008 | −0.006 |
| | (0.03) | (0.02) | (0.03) | (0.02) | (0.03) | (0.03) | (0.02) | (0.02) |
| *cash* | −6.4e−07 | 7.5e−06 | −1.3E−06 | 8.7E−06 | −8.5E−07 | −8.1E−06 | 2.1E−06 | −5.2E−06 |
| | (5.6e−06) | (5.7e−06) | (6.1e−06) | (6.4e−06) | (6e−06) | (7.4e−06) | (5.7e−06) | (5.7e−06) |
| *kmsw* | −0.008 | −0.01 | −0.02 | −0.01 | −0.008 | −0.02 | −0.02 | −0.03† |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.01) |
| *speed* | | 0.55* | −0.07* | 0.07† | −0.02 | −0.08* | 0.03 | 0.4* |
| | | (0.2) | (0.03) | (0.04) | (0.03) | (0.04) | (0.05) | (0.2) |
| *swtotal* | | −0.16† | | | | | | −0.12 |
| | | (0.09) | | | | | | (0.07) |
| *speedXswtotal* | | −0.7* | | | | | | −0.39† |
| | | (0.3) | | | | | | (0.22) |
| *cmmi* | | | 0.02 | | | | | 0.006 |
| | | | (0.02) | | | | | (0.02) |
| *speedXcmmi* | | | 0.09** | | | | | 0.04† |
| | | | (0.03) | | | | | (0.02) |
| *revexcust* | | | | −0.001* | | | | −0.001† |
| | | | | (0.001) | | | | (0.001) |
| *speedXrevexcust* | | | | −0.002* | | | | −0.002** |
| | | | | (0.001) | | | | (0.001) |
| *debt* | | | | | −0.2† | | | −0.18* |
| | | | | | (0.1) | | | (0.08) |
| *speedXdebt* | | | | | −0.38* | | | −0.01 |
| | | | | | (0.16) | | | (0.13) |
| *intlexp.* | | | | | | 0.0004 | | 0.0006 |
| | | | | | | (0.004) | | (0.003) |
| *speedXintlexp.* | | | | | | 0.008* | | 0.009** |
| | | | | | | (0.004) | | (0.003) |
| *attrition* | | | | | | | −0.002 | −0.001 |
| | | | | | | | (0.001) | (0.001) |
| *speedXattrition* | | | | | | | −0.005 | −0.002 |
| | | | | | | | (0.004) | (0.003) |
| *_cons* | −0.004 | 0.07 | 0.05 | −0.02 | −0.01 | 0.03 | −0.02 | 0.11 |
| | (0.09) | (0.1) | (0.1) | (0.07) | (0.09) | (0.1) | (0.09) | (0.09) |
| Wald Chi-Sq. | 40.22 | 46.6 | 73.7 | 75.52 | 143.77 | 32.2 | 41.12 | 2970.8 |
| Prob > Chi-Sq. | 0.0001 | 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | 0.0069 | 0.0005 | < 0.0001 |
| N | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 |

Note: numbers in parentheses are robust standard errors. Year dummies are included and not shown.
*** $p < 0.001$.
** $p < 0.01$.
* $p < 0.05$.
† $p < 0.10$.

Table 3 shows the results of our empirical tests. All the models include year dummies. Model M0 introduces the control variables. Model M1 adds to M0 Speed, the Software/Total employees ratio (*swtotal*), and their interaction and tests H1a. Likewise, models M2–M6 add to the control variables Speed, the CMMI (*cmmi*), the Revenue from Existing Customers (*revexcust*), Debt (*debt*), International Experience (*intlexp*), and Attrition (*attrition*), and the interactions with each of them, and test H1b, H2 with Revenue from Existing Customers as measure, H2 with

Debt as measure, H3a, and H3b, respectively. Finally, M7 is the full model. M1 and M3 show that the interactions of Speed the Software/ Total employee ratio and with the Revenues from Existing Customers, respectively, are both significant and negative or the opposite of what we predicted. The coefficient of the interaction of Speed with CMMI (M2) is positive and significant. The interaction of Speed with the Debt (M4) is negative and significant consistent with our hypothesis. We found also that the interaction of Speed with International Experience (M5) is positive and significant as predicted in H5. Finally, we found no significant results for the interaction of Speed with the Attrition rate (M6).

## 4. Discussion

We used the LLL perspective to identify resources that can moderate the SI-P relationship in the context of Indian software companies. Our empirical tests showed that rapid internationalization constitutes an effective strategy for EMNEs that have developed strong linkage capabilities. We find strong evidence for firms to establish internal linkages. Our results recommend to the managers of service EMNEs to go for an internationally renowned accreditation, such as CMMI level-5 accreditation in the case of software firms, before they begin to internationalize rapidly. Such quality certifications signal to potential clients the ability of a firm to undertake larger and more complex projects (e.g., Arora, Arunachalam, Asundi, & Fernandes, 2001).

In line with the LLL perspective, we found external linkage capabilities to be significantly moderating the SI-P relationship. However, our measure (the relative importance of the software developers) showed an opposite result. It seems that rapidly internationalizing EMNEs need to emphasize equally on acquiring marketing, administrative, or other managerial talent. It seems that EMNEs' marketing and administrative staff enables the firms to link with not only clients but also other stakeholders in order to gain legitimacy and reduce the liability of outsidership in a new host country. Therefore, by trading off their technical talent for other types of human resources, these firms are likely to be in a better position to overcome the issues resulting from rapid internationalization. To that extent, our results support the prior work by Sapienza et al. (2006) who underscore a need to grow managerial talent for an internationalizing firm as managers are required to establish routines in order to capture and facilitate information flow in an internationalizing firm. At the same time, our results (that favor administrative and marketing staff over technical staff) indicate the importance of linkages with not only clients (as stated by the LLL perspective) but also host country institutions.

We had predicted that leveraging capabilities significantly improved the performance of a rapidly internationalizing firm. Such capabilities result in a better understanding of a project brief and, in turn, reduce the amount of rework, lost time, budget overruns, and consequently, non-payment of services by clients. However, we found that leveraging capabilities captured in terms of revenues from existing customers negatively moderated the SI-P relationship. It seems that the EMNEs that are capable of getting high revenue from existing customers might be reluctant to seek new relationships, which may result in a strategic inertia. A rapid internationalization on the basis of an existing client relationship may decrease bargaining power of a vendor EMNE vis-à-vis its existing clients, with negative influence on profitability. At the same time, a service firm may become too specialized in only certain areas if it continues to work with existing customer at the expense of developing new client base. This may reduce a service firm's internationalization speed as its rather narrow expertise may not be fungible in many host countries. Moreover, it is highly likely that the positive influence of customer relationship on internationalization, as noted in the international business literature (Erramilli & Rao, 1993) may facilitate initial stage of internationalization. However, its efficacy for a long-term sustainability of a firm in a host country remained to be scrutinized. Our results show a need to grow customer base for rapidly internationalizing, yet profitable, firms. Overall, the results seem to suggest that rapidly internationalizing firms cannot solely depend upon their relationship with existing clients in order to be profitable. Instead, they also need to grow their customer base quickly by acquiring new customers in host countries.

Finally, having learning capabilities gained through international experience help mitigate some of the negative influence of rapid internationalization. Our research suggests that it is an important factor in managing performance when the emerging market software firms are internationalizing at a fast pace. However, we did not find significant results with regard to the learning retention capabilities. The finding seems to suggest that service firms, especially Indian software firms, have adjusted well to the high attrition rate that they have been facing in the industry for a very long time. It is highly likely that they are able to capture relevant knowledge from their employees and store it with help of tools such as knowledge management software. Second, as technology keeps changing, new employees, sometimes, may be better adept at new ways of doing things. At the same time, the human resource strategy perspective suggests that the effect of turnover level on organizational performance depends critically on the nature of the context or system in which the turnover occurs (Arthur, 1994). For example, with increased speed, customer profile keeps changing. Hence, the customer-specific personalized relationship of a vendor's employee may not be as important as perceived in the hypothesis. Moreover, Indian software firms may not necessarily view high attrition as negative. In fact, some software firms may have high employee attrition, especially at the lower to middle levels, as a core part of their business model. To that extent, our results support prior work that shows that with change in environment, new recruitment yields better results (Boyne & Meier, 2009).

### 4.1. Limitations and future research

Our results apply, first and foremost, to the Indian software service industry, but they could be extended to the most service industries that are project-based and where there is a separation of service production and consumption. The results may be applied to the broader group of EMNEs also.

Further, our data is restricted to top 32 Indian software firms over a ten-year period, albeit the coverage of the industry is extensive considering the high level of concentration (the top three firms account for 46% of the total exports; see Gopal & Gao, 2009; Kumar et al., 2009; Nadkarni & Herrmann, 2010; Pradhan, 2007). The small sample sizes are not unusual in the studies of the SI-P relationship (e.g., 22 Dutch firm in Vermeulen & Barkema, 2002, or 25 Spanish companies in Garcia-Canal & Guillen, 2008) and reflect the challenge of data collection. With improvements in data collection and availability, future studies can make use of more extensive data and longer time periods. Such longer time periods will among others make it possible to investigate the role of external shocks such as the global financial meltdown on SI-P relationship. In particular, and closer to the setting of our study, it's worthwhile revisiting the moderators of SI-P relationship in light of the fact that India's IT sector was reporting growth when developed nations were still recovering from the aftermath of the 2007–2009 global financial crisis (Malik, 2017). At the same time, now, Indian software firms find themselves in the midst of some new set of drivers for competitiveness that differ from the pre global financial meltdown era (Malik, 2017).

Future research – provided that the data are available – can also expand the range of variables considered to influence the SI-P relationship. For instance, it will be interesting to examine the top management team's ethnic connections, firm's entry mode switches, and firm rivalry (Chandra et al., 2012; Chang & Rhee, 2011; Gao & Pan, 2010; Musteen et al., 2010). Similarly, scholars have recently recognized that the depth and diversity of international experience may have differential impact on speed (Casillas & Moreno-Menendez, 2014).

Provided our inconclusive results regarding the role of human resources attrition in SI-P relationship, we suggest the future studies to consider the possibility of a mitigation of the negative impact of attrition on performance by process conformance (Ton & Huckman, 2008). Also, a finer-grained measure, such as, the level at which such attrition occurs, may help since it is likely that much of the attrition in Indian software firm is happening at lower or entry levels, and hence, does not significantly affect the relationship in question. Despite these limitations, our study unpacks the SI-P relationship in a unique context of software service firms.

**Naveen Kumar Jain** is an Associate Professor of Management at the Department of Management, Sultan Qaboos University (SQU). Naveen earned his PhD from Florida International University, Miami, Florida, USA. Prior to joining SQU, he worked in the academic field in the USA and the UAE. He also worked in Corporate India for > 10 years before joining the academic world. His research interests cover various aspects of International Business, Strategic Management and HR/OB. More specifically, he has conducted research on the internationalization of emerging market firms, corporate reputation and governance, personality and knowledge transfer. He also has presented in a number of international conferences including the Academy of Management (AOM), the Academy of International Business (AIB) and Strategic Management Society (SMS). Naveen has taught at both the undergraduate and the postgraduate level.

**Sokol Celo** is Associate Professor of Strategy and International Business at Suffolk University. He is a PhD from Florida International University and his areas of expertise include international location decisions, cognition and managerial decision making, and institutions and institutional change. He is a member of the Academy of International Business and has published in the Journal of International Business Studies and Journal of International Management among other journals.

**Vikas Kumar** is Head of Discipline and Associate Professor in the Discipline of International Business at the University of Sydney Business School. His previous appointments were at Bocconi University as Assistant Professor in the Department of Management, and as Visiting Scholar at Stanford University and Dunning Fellow at University of Reading. He is senior editor at the *Asia Pacific Journal of Management*, and currently serving as Vice-President of the Asia Academy of Management.

Vikas was representative-at-large for the Global Strategy Interest Group in the Strategic Management Society (SMS) and was co-chair for the Sydney SMS Special Conference in December 2014. He was the program chair of the Australia New Zealand International Business Academy (ANZIBA) 2016 conference and co-program chair for the Asia Academy of Management (AAOM) Conference in 2017. He is founding director of the Emerging Market Internationalization Research Group at the University of Sydney Business School.

Vikas is interested in studying the internationalization strategies employed by firms from emerging markets such as India. His research involves understanding the unique aspects of the institutional and cultural context of emerging markets and the influence context has on firm strategies. His research has been published in *Journal of World Business*, *Global Strategy Journal*, *Management International Review*, *Journal of Management Studies*, *Journal of International Management and Long Range Planning* among other journals in the field of international business and management. Vikas has co-edited a book on 'Global outsourcing and offshoring' published by Cambridge University Press and on 'Emerging Market Firms' published by Emerald.

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